

Response Under 37 CFR 1.116

Expedited Procedure

Examining Group 1700

Application No.: 10/624,921

Paper Dated: January 10, 2007

In Reply to USPTO Correspondence of July 10, 2006

Attorney Docket No. 2398-031312

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended): A magnetron sputtering electrode for use with a magnetron sputtering device, the magnetron sputtering electrode comprising:

a cathode body;

a rotary drive unit coupled to the cathode body;

a target having an outer edge received by the cathode body;

a closed magnet arrangement received within a magnet receiving chamber and coupled to the drive unit, the closed magnet arrangement comprised of a plurality of magnets adapted for motion relative to the target by the drive unit, wherein at least one of the plurality of magnets is a profiled magnet, the profiled magnet having a contoured top portion and defining an apex is positioned adjacent to the outer edge of the target; and

a support plate coupled to the rotary drive unit, wherein the support plate includes one or more spacer blocks situated on the support plate, wherein the spacer blocks are constructed of non-magnetic material, and wherein the plurality of magnets are arranged on the support plate such that a portion of the contoured top portion of each of the plurality of magnets is positioned beneath an upper surface of the spacer blocks, and wherein the rotary drive unit rotates the magnet arrangement whereby the motion further comprises two or more rotational degrees of freedom of movement about an axis.

2. (Previously Presented): The magnetron sputtering electrode as claimed in claim 1, wherein the plurality of magnets cooperate to generate magnet flux lines which form a closed magnetic tunnel adjacent to a front sputtering surface of the target.

3. (Original): The magnetron sputtering electrode as claimed in claim 1, wherein the target is one of a linear target and a circular target.

4. (Cancelled)

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5. (Previously Presented): The magnetron sputtering electrode as claimed in claim 1, wherein the drive unit is comprised of at least one drive shaft and at least one motor, wherein the at least one drive shaft is coupled to the support plate and the at least one motor is coupled to the at least one drive shaft.

6. (Previously Presented): The magnetron sputtering electrode as claimed in claim 5, wherein activation of the at least one motor causes the magnet arrangement to rotate about an axis.

7. (Previously Presented) The magnetron sputtering electrode as claimed in claim 1, wherein the motion is one of concentric motion and eccentric motion.

8. (Cancelled)

9. (Previously Presented): The magnetron sputtering electrode as claimed in claim 1, wherein the support plate includes channels for accommodating the plurality of profiled magnets.

10. (Cancelled)

11. (Original): The magnetron sputtering electrode as claimed in claim 1, wherein the form of the profiled magnet is one of a rectilinear form and a cylindrical form.

12. (Original): The magnetron sputtering electrode as claim in claimed 1, wherein the contoured top portion is one of an angled shape, sloped shape, conical shape, parabolic shape, convex shape, and a concave shape.

13. (Currently Amended): A magnetron sputtering electrode for use with a magnetron sputtering device, the magnetron sputtering electrode comprising:

a cathode body;

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a rotary drive unit coupled to the cathode body, wherein the drive unit is comprised of a drive shaft and a motor;

a target having an outer edge received by the cathode body;

a closed magnet arrangement comprised of an inner assembly and an outer assembly, the inner assembly and the outer assembly comprised of a plurality of profiled magnet segments, wherein each of the profiled magnet segments includes a contoured top portion having an apex, wherein the closed magnet arrangement is situated beneath the target and is coupled to the drive shaft, wherein at least one of the profiled magnet segments has an apex positioned adjacent to the outer edge of the target, and wherein the drive shaft is adapted to rotate the closed magnet arrangement in relation to the target; and

a support plate coupled to the rotary drive unit, wherein the support plate includes a plurality of spacer blocks situated on the support plate, wherein the spacer blocks are constructed of non-magnetic material, and wherein each of the profiled magnet segments is arranged on the support plate such that a portion of the contoured top portion of each of the profiled magnet segments is positioned beneath an upper surface of the plurality of spacer blocks, and wherein the rotary drive unit rotates the magnet arrangement whereby the motion further comprises two or more rotational degrees of freedom of movement about an axis.

14. (Currently Amended): The magnetron sputtering electrode as claimed in claim 13, wherein the apex of the contoured top portion ~~comprises an apex~~ that is flat, wherein the apex is up to half the thickness of the magnet segment.

15. (Currently Amended): A method of improving target utilization in sputtering applications, the method comprising:

providing a substrate;

providing a cathode body;

providing a target having an outer edge received by the cathode body;

providing a closed magnet arrangement within a magnet receiving chamber, the closed magnet arrangement comprised of a plurality of magnets, wherein at least one of the plurality of magnets is a profiled magnet having a contoured top portion, ~~wherein~~ the contoured top portion includes an apex that is flat, wherein the apex is up to half the thickness

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of the magnet segment and wherein the apex is positioned adjacent to the outer edge of the target;

moving the closed magnet arrangement in relation to the target, wherein the motion further comprises two or more rotational degrees of freedom of movement about an axis, wherein the two degrees of freedom of movement are selected from concentric motion and eccentric motion;

obtaining target material from the target; and

depositing the target material on the substrate.

16. (Cancelled)

17. (Previously Presented): The method of claim 15, wherein the contoured top portion is adapted to direct magnetic flux lines to a front sputtering surface of the target.

18. (Previously Presented): The method of claim 15, further comprising a motor, wherein the motor rotates the closed magnet arrangement.

19. (Cancelled)

20. (New): The magnetron sputtering electrode as claimed in claim 1, wherein a portion of the contoured top portion of the profiled magnet is positioned at the outer edge of the target.

21. (New): The magnetron sputtering electrode as claimed in claim 1, wherein a portion of the contoured top portion of the profiled magnet extends beyond the outer edge of the target.

22. (New): The magnetron sputtering electrode as claimed in claim 13, wherein a portion of the contoured top portion of the profiled magnet segment is positioned at the outer edge of the target.

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23. (New): The magnetron sputtering electrode as claimed in claim 13, wherein a portion of the contoured top portion of the profiled magnet segment extends beyond the outer edge of the target.

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